Thoughts on the Production that will be done in September

Sarah Eno

Our Next Production

David has "booked" the CERN Linux production farm for September

(so I imagine our next HLT milestone will be in the beginning of November (like last year))

What production needs will the jet/met group have on this timescale?

Goals

Code:

- new CMSIM with new tracker (b-tau group) (cms120, end July)

- "correct" simulation of HCAL electronics (Salavat)

- larger HF CMSIM library, shorter time quantization in HCAL (cms118), more realistic eta boundaries in HCAL, more realistic cabling, more realistic position for endcap (*Shuichi, do you know who will do this stuff?*)

- combined ntuple maker (Jim Brooke)

Taus (Sasha) :

- incorporate tracking into Tau ID

Jets :

- separate calibrations for generic, b, and tau jets (Silvia)

- continue work on offline algorithms for low E_T jets at high lum (Andrei)

- improve resolution by better pileup subtraction at high lum (Irina)

Goals

MET (Pal):

- design algorithms to optimize offline resolution

- redo rate with adequate statistics

Signals (Salavat):

- need to start checking the efficiency of our trigger table for a variety of signals

Combined Triggers (e+jet, jet+met, etc):

- providence of the lepton groups, not us? they will provide production for these?

JPG Production

will be done at CERN by FNAL physicists

Hans Wenzel (FNAL) has kindly agreed to take charge of this effort for the JPG group!

Please send him your production needs!

Here are my preliminary thoughts on needs...

Production needs: Tau

will need new production, to use new tracker geometry

- currently tau selection requires $P_T(tau) > 45$ GeV

- we have about 74k events with generator $P_T > 45$ GeV (and this will also be approximately equal to 1/2 the number of reconstructed jets with $P_T > 45$ GeV)

- *guess* factor 5 rejection for L1 tau trigger, and 5 for L2.0 tau trigger $\rightarrow$ 25? or 15 k events after L1 and L2.0

- hope for factor 10 from tracking $\rightarrow$ 1.5 k events passing elections?

$\rightarrow$ this should be enough stats for "november" milestone

can we just select out the events that pass the current L2.0 (about 15 k?) and process them with the new cmsim, or do we need to reprocess the entire sample?

need to pull some events out from current sample, reprocess with different GEANT seeds, and see if they still pass L2.0 *who can do this?*

Sasha, what do you think about this?

Production needs: Low E_T Jets

Low ET jets *may* be sensitive to the details of the HCAL electronics simulation and the pedestal simulation (see my next talk)

wait for results of Salavat's study. may need a re-processed sample

however, there are plenty of low ET jets. We won't need to reprocess the entire QCD sample. maybe just the 20-30 (196 k events) and 30-50 (103 k events) bins?

Andrei, what do you think?

Production needs: Jet Calibration

- large $H \rightarrow \tau\tau$ sample can give us

  - tag jets to improve stats for HF calibration

  - τ jets with "right" E_T spectra for τ-jet calibration

- large $H \rightarrow bb$ sample for b jet calibration?

Silvia, can you investigate how many events we'll need and report to Hans?

Production needs: MET

the MET triggers require some thought... Pal's current L1 MET>80 rate is about 35 KHz *(or, if you take the pass rate from the 15-20 bin (0.0016) and multiply it by the crossing rate of 32 MHz, you get 51 kHz)),* which is ridiculous, given the total L1 budget is 75 kHz. But, an L1 MET>80 cut is fully efficient only for generator-level METs of about 175 GeV, so a higher threshold is also ridiculous. So, MET-only triggers are not very interesting. What we need here is just a large minimum bias sample, to understand how to optimize the MET resolution in general.

Also, MET will probably mostly be used in triggers that contain a large E_T object like an electron or jet above 50 GeV. The sources of fake MET in these events may be different than in a generic event. Want a sample of events with a high PT jet or electron. Can steal samples from the e-gamma group, the tau studies, and the current QCD samples...

no need for new production? (as long as the large min-bias only sample is made for this run)

L1: 75 kHz, L2: 1 kHz, L3: 100 Hz

cross triggers

e+X in egamma group? mu+X in muon group? jet+MET in our group?

so far, we have been working purely on object (e, mu, etc) identification at the trigger level. However, when we design cross triggers, we are no longer doing object id, and the properties of the cross triggers we design (and thus the production samples we need to study them) will depend strongly on the types of physics we wish to trigger on.

so far, only have 2 "signals" that are purely hadronic

> Higgs$\rightarrow\tau\tau$: can study this using the tau id sample. after adding tracking, still expect to have 1.5 k events. can study effect of adding MET cut or beam jet requirements using these stats?

> hadronic squark/gluino decays: offline cuts are listed as 2 jets>40 and MET>50. However, it is not clear that these are realistic offline cuts for high luminosity. need to understand what we want to do here at high lum before we can proceed... *(who can do this? do we really want to at this time?)*

are there more purely hadronic signals we should be considering?

Production: other considerations

can we combine production with ntuple making? (probably won't be ready, but maybe we can do ntuple production at FNAL using the techniques that are learned by doing the ORCA production?)